

Amendments to the Drawings:

The first attached sheet of drawings includes changes to each of FIGS. 1, 2 and 3. This sheet, which includes FIGS. 1, 2 and 3, replaces the original sheet. Each of FIGS. 1, 2 and 3 have been designated as "Prior Art".

The second attached sheet of drawings includes changes to FIG. 4A. This sheet, which includes FIGS. 4A, 4B and 4C, replaces the original sheet. In FIG. 4A, reference numeral "406" has been corrected to "403" to designate a composite side, and reference numeral "406" has been added to designate the linear apex.

The third attached sheet of drawings includes changes to FIG. 4G. This sheet, which includes FIGS. 4D, 4E, 4F, 4G and 4H, replaces the original sheet. In FIG. 4G, the lead line for reference number 434 has been extended to contact linear apex 434.

The fourth attached sheet of drawings includes changes to FIG. 6A and to FIG. 6B. This sheet, which includes FIGS. 5, 6A and 6B, replaces the original sheet. In FIGS. 6A and 6B, "S" has been corrected to " Σ ", the "4" above "S" has been deleted, and the "^" above "y" has been deleted.

Attachment: Replacement Sheets
Annotated Sheets Showing Changes

REMARKS

Applicant has amended claims 1, 16, 30 and 44. Various paragraphs throughout the specification have been amended. Figures 1, 2, 3, 4A, 4G, 6A and 6B have also been amended.

Claims 1-31 are pending, with claim 15 having been withdrawn. Reconsideration of this application, as amended, is requested.

Objections to Drawings and Specification

In Figure 4A, reference numeral "406" has been corrected to "403" to designate a composite side, to be consistent with page 21 of the specification.

Page 22 of the specification has been amended to recite reference numerals 402 and 404, which are shown in Figure 4A for the center points of the composite sides.

Reference numeral "406" has been added to Figure 4A to designate the linear apex, to be consistent with page 21 of the specification.

Additionally, Figures 6A and 6B have been amended to correct "S" to " Σ ". Additional changes to Figures 6A and 6B, and to Figures 4A and 4G, have also been made, as described in the previous section titled "Amendments to the Drawings".

The Claims, Generally

The presently claimed invention is directed to various methods of making abrasive articles. Each abrasive article made includes an array of protruding units, the array being at least two by two. Each unit has a base defined by a perimeter, which includes a first side and a second side opposite to the first side. Distal to the base, each unit has a distal linear region, which when projected on to a plane that is coplanar with its respective base, extends between a non-central point on the first side of the base and a non-central point on the second side of the base. Additionally, this distal linear region is not positioned at the perimeter of the base; that is, it does not extend to the perimeter. In other words, the distal linear region is not positioned orthogonal (or, 90 degrees) to the perimeter.

Section 112 Rejections

Claims 30-57 were rejected under 35 U.S.C. 112, second paragraph. Although Applicants disagree that the claims are unclear, claims 30 and 44, the independent claims have been amended, to better clarify the claimed subject matter. Applicants contend that these amendments address the Examiner's issues and request that the rejection be withdrawn.

Section 102 / 103 Rejections

Claims 1, 2, 5-7, 9, 11, 13-14, 16-17, 20-22, 24, 26, 28-31, 34-36, 38, 40, 42-45, 48-50, 52, 54, and 56-57 were rejected under 35 U.S.C. 102(b) as anticipated by, or in the alternative, under 35 U.S.C. 103(a) as obvious over Pieper et al. (U.S. Patent No. 5,152,917).

Claims 3, 4, 8, 10, 12, 18, 19, 23, 25, 27, 32, 33, 37, 39, 41, 46, 47, 51, 53 and 55 were rejected under 35 U.S.C. 103(a) as obvious over Pieper et al. All of these rejected claims are dependent claims off of one of claims 1, 16, 30 or 44.

Applicants disagree with these rejections.

Applicant does not disagree that Pieper et al. discloses methods of making abrasive articles and abrasive arrays of protruding units. The methods disclosed include providing an abrasive slurry onto a backing and then contacting the backing with a production tool, and providing an abrasive slurry onto a production tool and then contacting a backing. The binder in the slurry is at least partially cured, and the product is removed from the production tool, after which it may be further cured. The articles and arrays of Pieper et al. include protruding units (composites) that can be of various shapes, including pyramids (FIGS. 6, 7, and 18) and, linear and sawtooth patterns.

FIG. 9 of Pieper et al. illustrates a sawtooth pattern of protruding units, each unit having a distal linear region or apex that extends between a non-central point on the first side of the base and a non-central point on the second side of the base. The distal linear region of this sawtooth pattern is positioned 90 degrees to or orthogonal to the base edge. The projection of this distal linear region is co-linear with an edge of the base. Further, these sawtooth protruding units are arranged in a one-by-two matrix, with a line of composites arranged to have linear grooves therebetween.

Pieper et al. does not anticipate, or render obvious, the pending claims for at least for the following reasons.

Pieper et al. does not disclose methods of making a two-by-two array of protruding units having the requisite characteristics of the pending claims. FIG. 9 of Pieper et al. merely shows a "one-by" array, the array being only one unit wide (in the paper direction). Two-by-two arrays are illustrated in FIGS. 4B, 4C, 6A and 6B of the pending application.

FIG. 9, and also FIG. 8, do disclose an array of protruding units; see, for example, column 8, lines 16-17 and lines 19-20 which state that the FIGS. 8 and 9 show linear grooves, which can be abrasive composites disposed in a predetermined array. What FIG. 8 shows is a 2x1 array of protruding units, and what FIG. 9 shows is a 4x1 array (with the fourth protruding unit only being shown partially on the left side of FIG. 9). Both of these arrays are only one unit deep (in the paper direction). These disclosures do not meet the limitation of a 2x2 array.

Pieper et al. also does not disclose protruding units, as required by the pending claims, where the distal linear region is not positioned orthogonal to the perimeter of the base. FIG. 9 of Pieper et al. shows the distal linear apex, when projected down onto the base, as being at the perimeter of the base. The apex forms a 90 degree angle with the base. Protruding units where the distal linear region is not positioned at the perimeter are illustrated in FIGS. 4A, 4B, 4C, 4D, 4E, 4G, 4H, and 6B. The pending claims require that the distal linear region, when projected onto the base, is not co-linear with a third side of the perimeter.

The Office Action directs Applicant's attention to FIG. 18 of Pieper et al. and indicates that this structure could be interpreted to read on the claimed abrasive array structure. Applicants disagree with this. FIG. 18 of Pieper et al. is a top view of an array of three-sided pyramidal shapes having an apex point, not of protruding units having distal linear region that extends between non-central points on the first side and second side of the base. The pyramidal composites of FIG. 18 are not within the scope of the currently pending claims.

There is no suggestion in Pieper et al. of making abrasive protruding units having the configuration recited in the pending claims. At least for these reasons, Applicants contend that Pieper et al. does not anticipate or render obvious the claims. At least because Pieper et al. does not meet every recitation of the pending independent claims, claims 1, 16, 30 and 44, and does not suggest every recitation of the pending independent claims, dependent claims are patentable at least for the same reasons that claims 1, 16, 30 and 44 are patentable. Withdrawal of these rejections is requested.

Appln no. 10/668,754

Amendment dated Jan. 26, 2006

Response to Office Action of Aug. 31, 2005

Summary

In view of the above amendments and remarks, Applicant respectfully requests a Notice of Allowance. If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone Applicant's attorney Dan Biesterveld, Reg. No. 45,898, at 651.737.3193.

Respectfully submitted,

Date:

Jan 26, 2006

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Reg. No. 40,066

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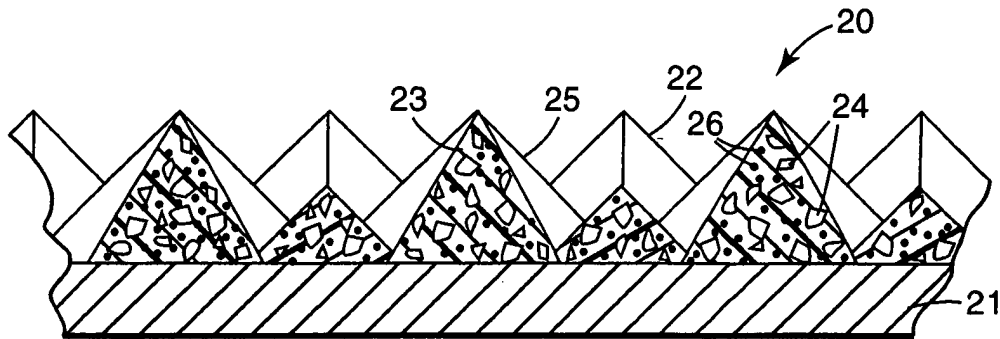


Fig. 1

Prior Art

new label

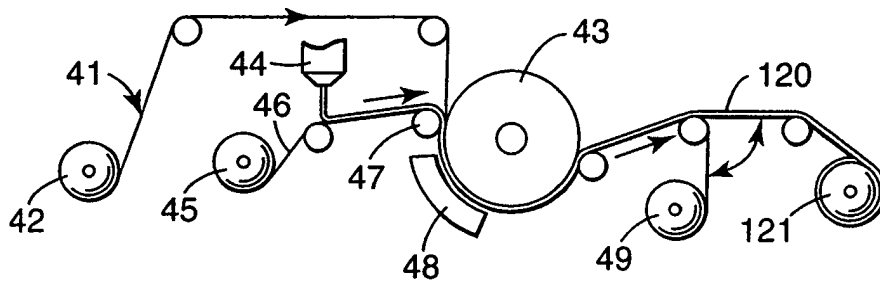


Fig. 2

Prior Art

new label

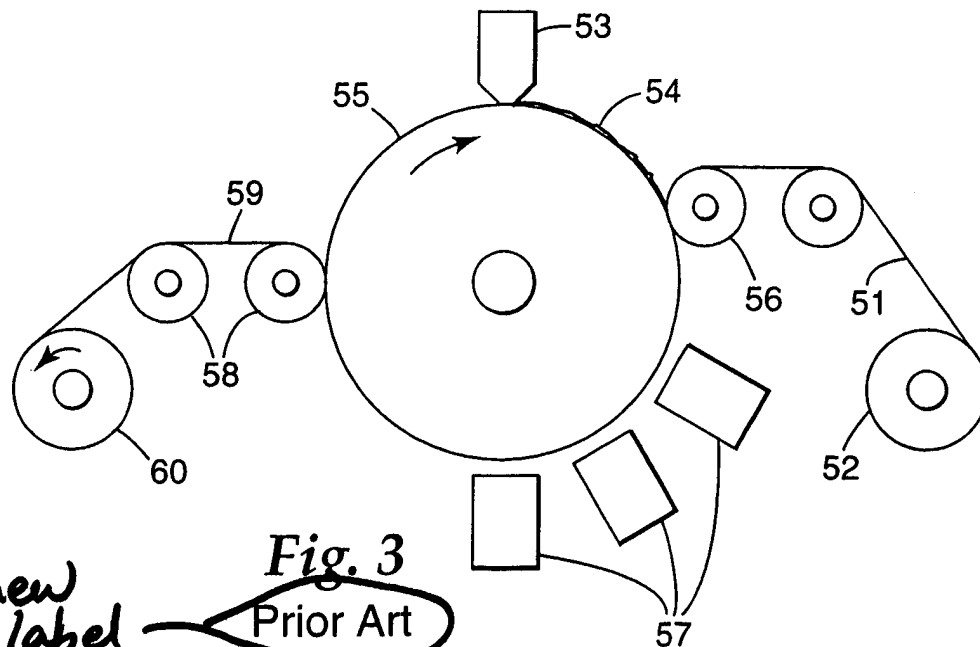


Fig. 3

Prior Art

new label

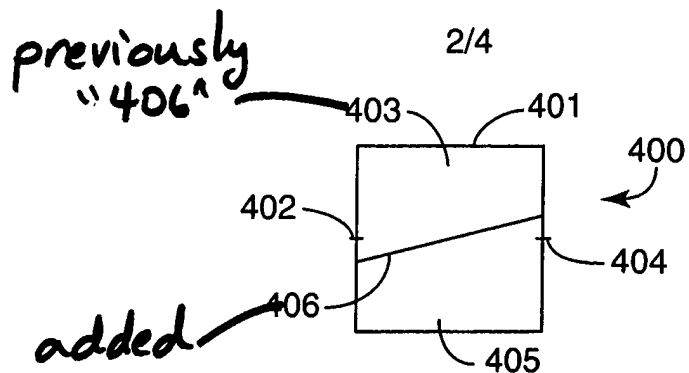


Fig. 4A

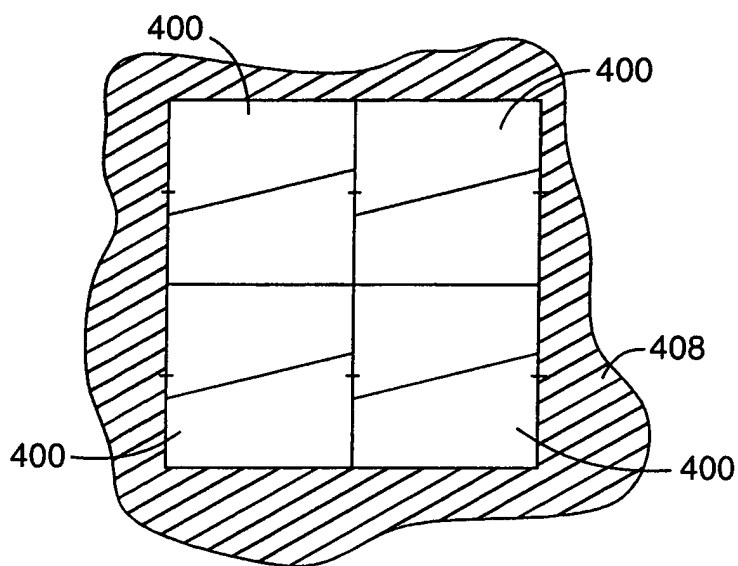


Fig. 4B

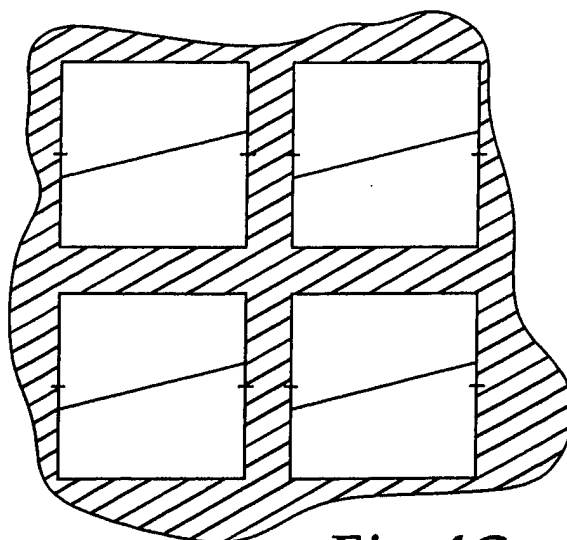


Fig. 4C

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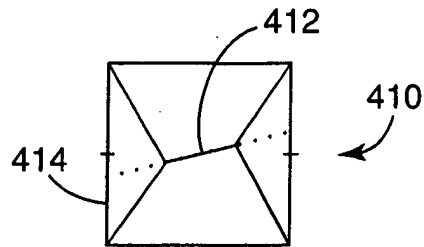


Fig. 4D

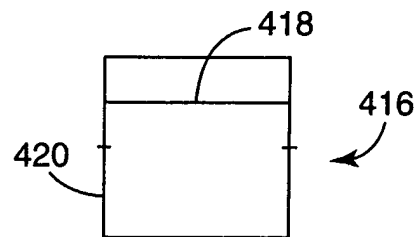


Fig. 4E

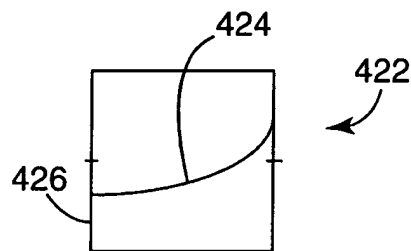


Fig. 4F

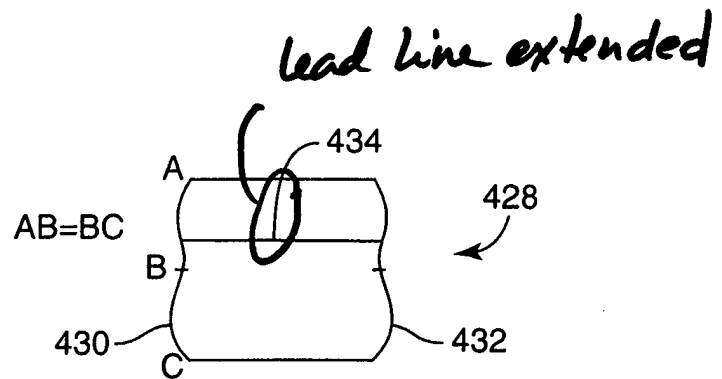


Fig. 4G

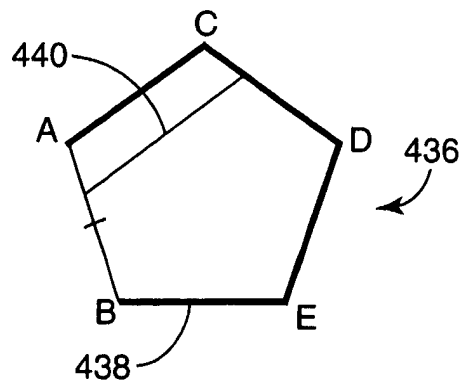


Fig. 4H

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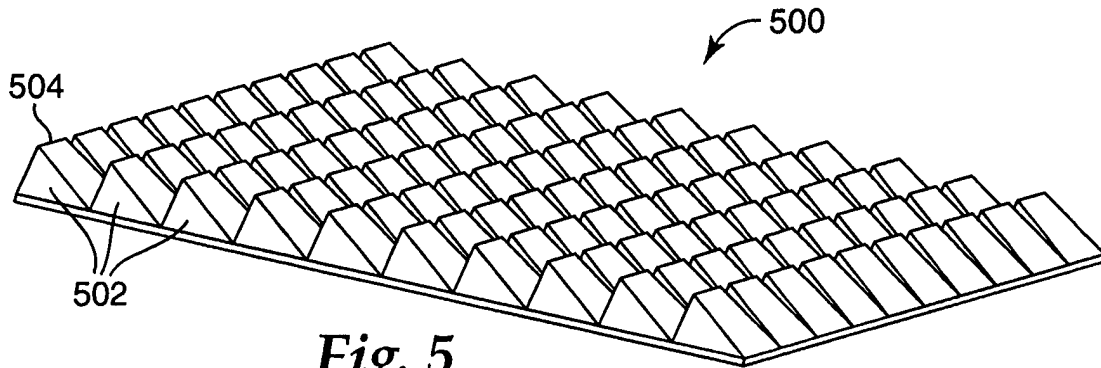


Fig. 5

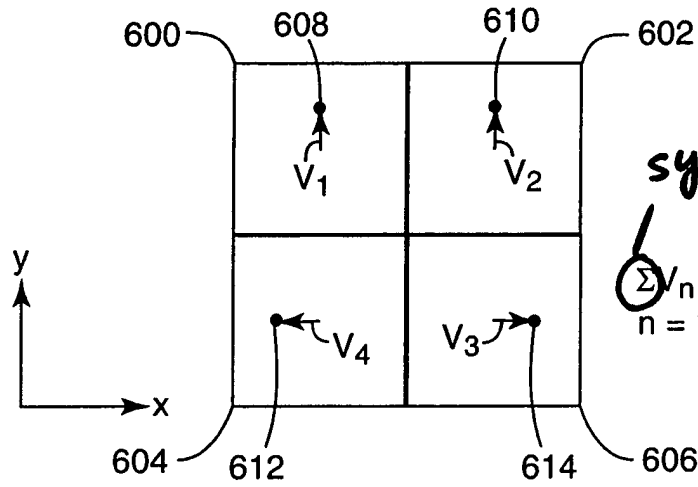


Fig. 6A

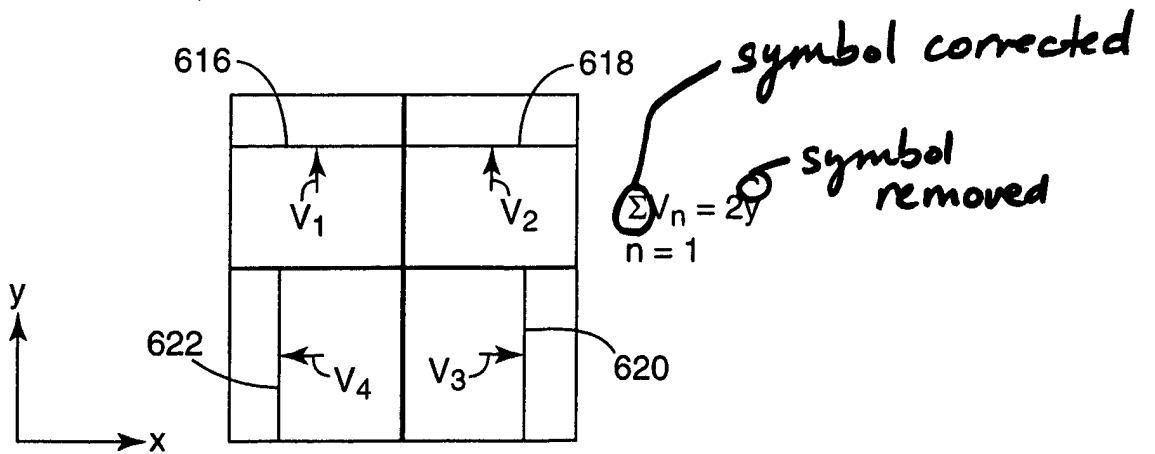


Fig. 6B